Day 1: Cyber Security Internship

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Task 1 : scan your local network with Open port

Objective: Learn to discover open ports on devices in your local network to understand network exposure.
Tools: Nmap (free), Wireshark (optional).

1.Install Nmap from official website
=> already installed
└─$ nmap --version
Nmap version 7.95 (https://nmap.org)
Platform: x86_64-pc-linux-gnu
Compiled with: liblua-5.4.7 openssl-3.5.3 libssh2-1.11.1 libz-1.3.1 libpcre2-10.46 libpcap-1.10.5 nmap-libdnet-1.12 ipv6
Compiled without:
Available nsock engines: epoll poll select

2.Find your local IP range (e.g., 192.168.1.0/24).
=>
└─$ ip a s
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host noprefixroute
       valid_lft forever preferred_lft forever
2: eth0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc fq_codel state DOWN group default qlen 1000
    link/ether 58:11:22:ea:3b:d8 brd ff:ff:ff:ff:ff:ff
3: wlan0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP group default qlen 1000
    link/ether 2c:3b:70:6c:b6:65 brd ff:ff:ff:ff:ff:ff
    inet 10.235.113.94/24 brd 10.235.113.255 scope global dynamic noprefixroute wlan0
       valid_lft 2816sec preferred_lft 2816sec
    inet6 2409:4081:1016:8537:aa84:41f1:f39f:794c/64 scope global dynamic noprefixroute
       valid_lft 6877sec preferred_lft 6877sec
    inet6 fe80::4b28:c98b:7466:fb74/64 scope link noprefixroute
       valid_lft forever preferred_lft forever

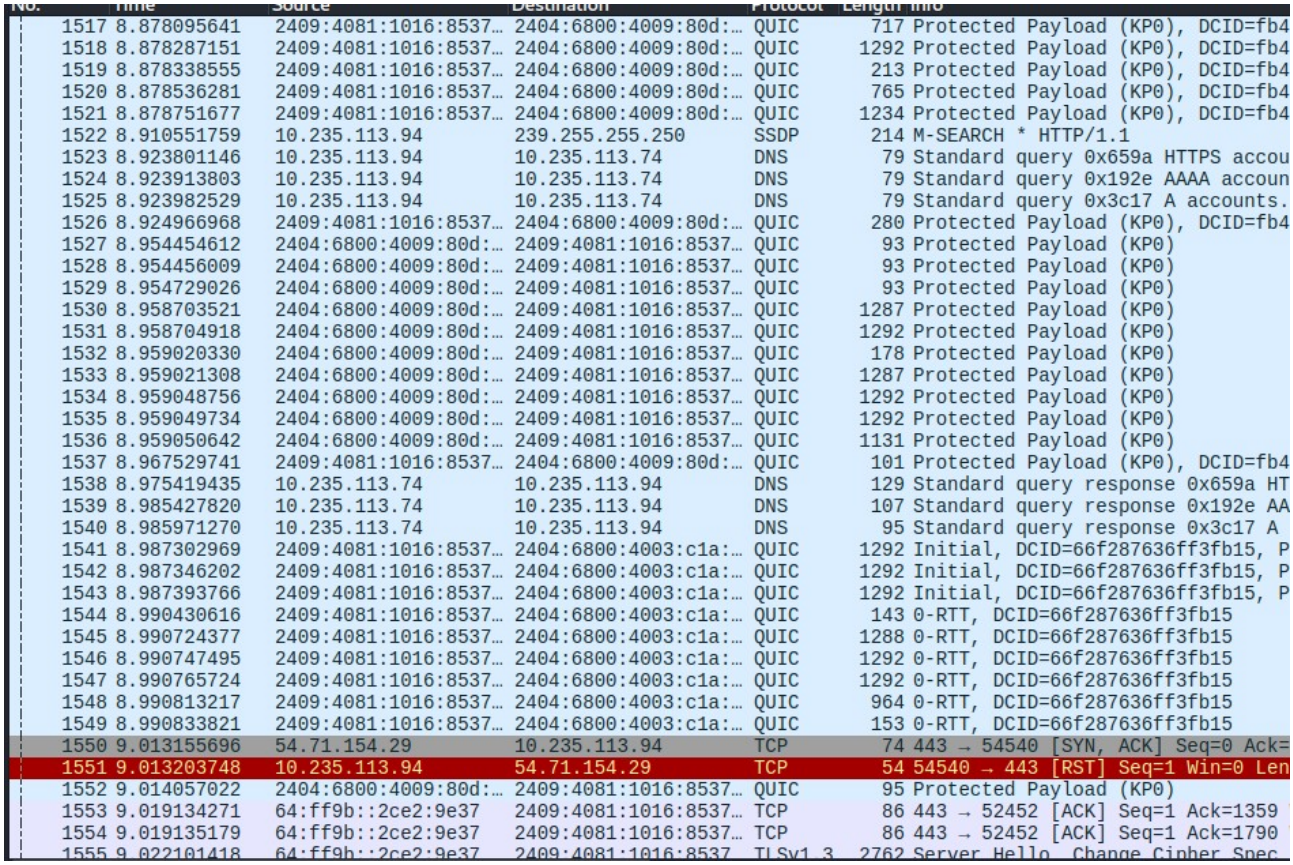
3. Run: nmap -sS 192.168.1.0/24 to perform TCP SYN scan.
=>
└─$ nmap -sS 10.235.113.0/24
Starting Nmap 7.95 (https://nmap.org) at 2025-10-20 22:08 IST
Stats: 0:00:02 elapsed; 0 hosts completed (0 up), 255 undergoing ARP Ping Scan
ARP Ping Scan Timing: About 27.45% done; ETC: 22:08 (0:00:08 remaining)

Stats: 0:00:06 elapsed; 0 hosts completed (0 up), 255 undergoing ARP Ping Scan
ARP Ping Scan Timing: About 62.75% done; ETC: 22:08 (0:00:04 remaining)
Nmap scan report for 10.235.113.74
Host is up (0.0046s latency).
Not shown: 999 closed tcp ports (reset)
PORT STATE SERVICE
53/tcp open domain
MAC Address: 2A:CB:ED:B6:46:14 (Unknown)

Nmap scan report for 10.235.113.94
Host is up (0.000015s latency).
All 1000 scanned ports on 10.235.113.94 are in ignored states.
Not shown: 1000 closed tcp ports (reset)

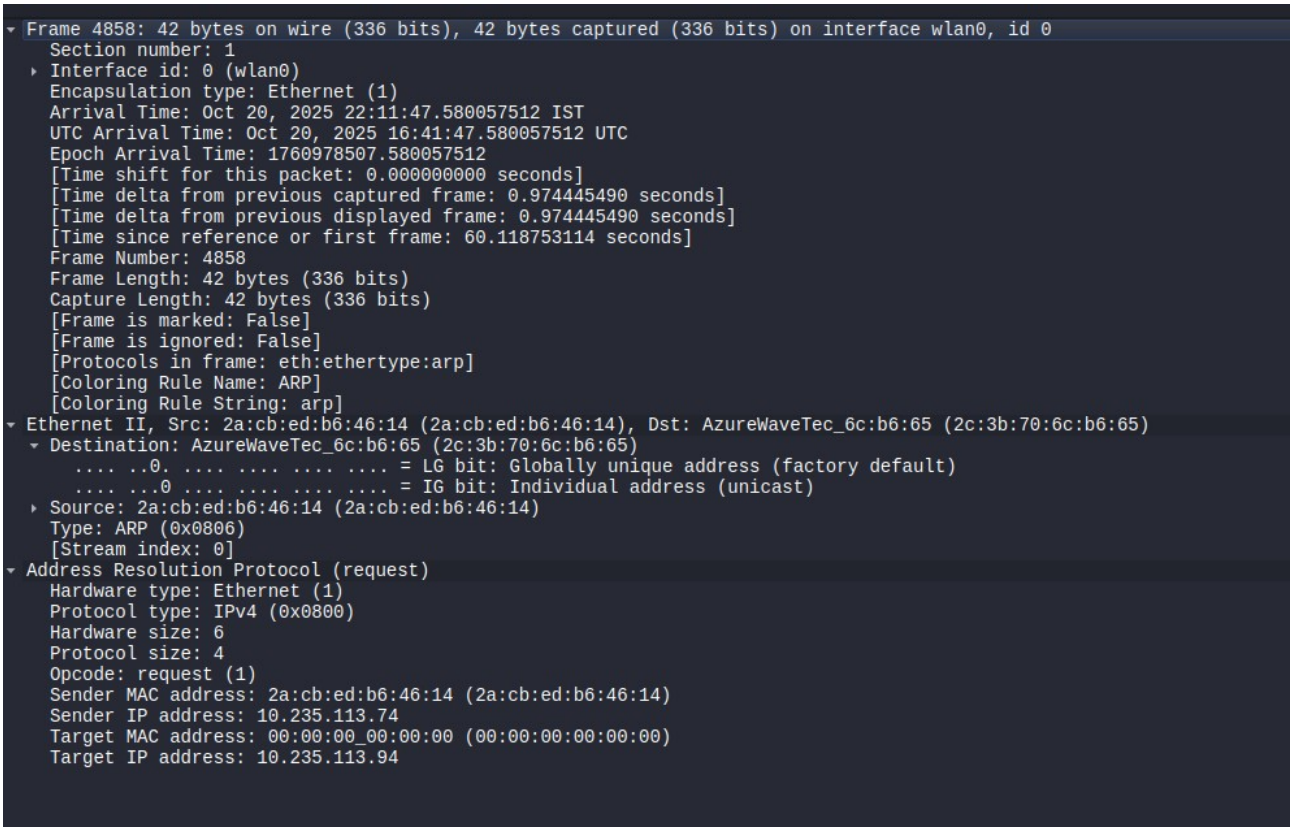
4.Note down IP addresses and open ports found.
=>
IP – 10.235.113.74
port – 53

5.Optionally analyze packet capture with Wireshark

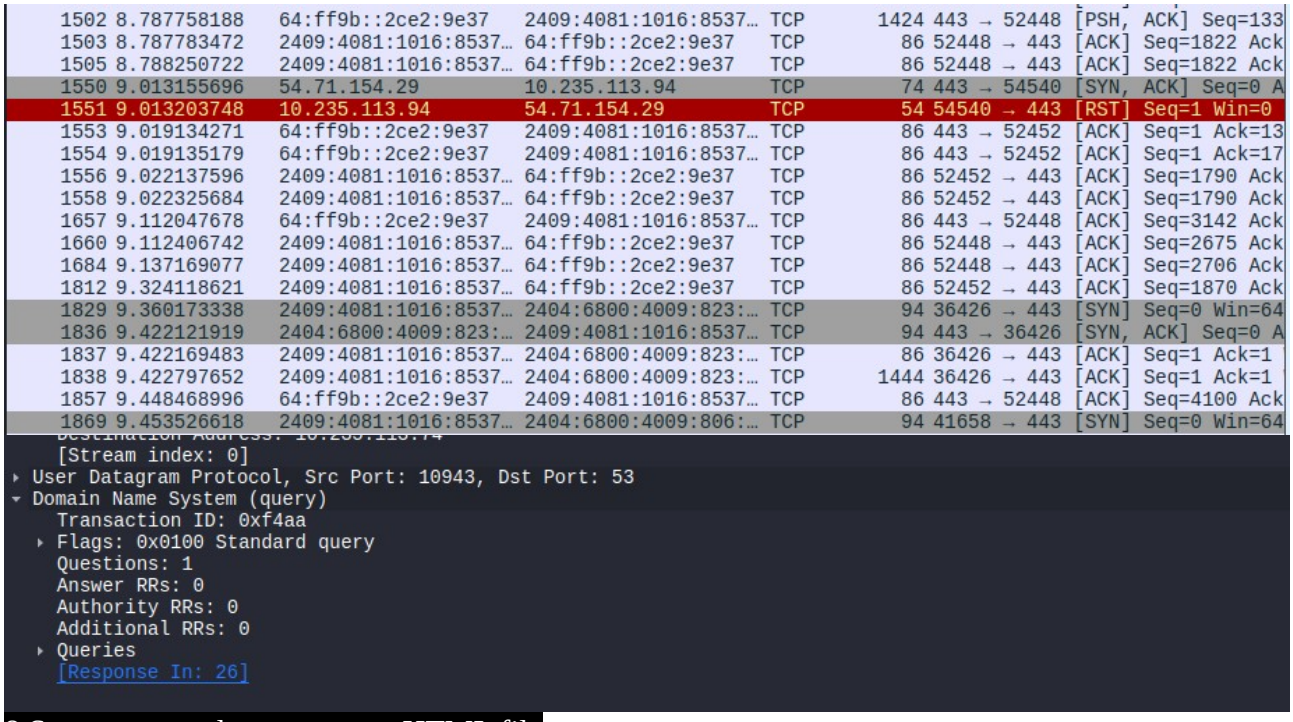


No.	Time	Source	Destination	Protocol	Length	Info
1517	8.878095641	2409:4081:1016:8537…	2404:6800:4009:80d:…	QUIC	717	Protected Payload (KP0), DCID=fb4
1518	8.878287151	2409:4081:1016:8537…	2404:6800:4009:80d:…	QUIC	1292	Protected Payload (KP0), DCID=fb4
1519	8.878338555	2409:4081:1016:8537…	2404:6800:4009:80d:…	QUIC	213	Protected Payload (KP0), DCID=fb4
1520	8.878536281	2409:4081:1016:8537…	2404:6800:4009:80d:…	QUIC	765	Protected Payload (KP0), DCID=fb4
1521	8.878751677	2409:4081:1016:8537…	2404:6800:4009:80d:…	QUIC	1234	Protected Payload (KP0), DCID=fb4
1522	8.910551759	10.235.113.94	239.255.255.250	SSDP	214	M-SEARCH * HTTP/1.1
1523	8.923801146	10.235.113.94	10.235.113.74	DNS	79	Standard query 0x659a HTTPS accou
1524	8.923913803	10.235.113.94	10.235.113.74	DNS	79	Standard query 0x192e AAAA accoun
1525	8.923982529	10.235.113.94	10.235.113.74	DNS	79	Standard query 0x3c17 A accounts.
1526	8.924966968	2409:4081:1016:8537…	2404:6800:4009:80d:…	QUIC	280	Protected Payload (KP0), DCID=fb4
1527	8.954454612	2404:6800:4009:80d:…	2409:4081:1016:8537…	QUIC	93	Protected Payload (KP0)
1528	8.954456009	2404:6800:4009:80d:…	2409:4081:1016:8537…	QUIC	93	Protected Payload (KP0)
1529	8.954729026	2404:6800:4009:80d:…	2409:4081:1016:8537…	QUIC	93	Protected Payload (KP0)
1530	8.958703521	2404:6800:4009:80d:…	2409:4081:1016:8537…	QUIC	1287	Protected Payload (KP0)
1531	8.958704918	2404:6800:4009:80d:…	2409:4081:1016:8537…	QUIC	1292	Protected Payload (KP0)
1532	8.959020330	2404:6800:4009:80d:…	2409:4081:1016:8537…	QUIC	178	Protected Payload (KP0)
1533	8.959021308	2404:6800:4009:80d:…	2409:4081:1016:8537…	QUIC	1287	Protected Payload (KP0)
1534	8.959048756	2404:6800:4009:80d:…	2409:4081:1016:8537…	QUIC	1292	Protected Payload (KP0)
1535	8.959049734	2404:6800:4009:80d:…	2409:4081:1016:8537…	QUIC	1292	Protected Payload (KP0)
1536	8.959050642	2404:6800:4009:80d:…	2409:4081:1016:8537…	QUIC	1131	Protected Payload (KP0)
1537	8.967529741	2409:4081:1016:8537…	2404:6800:4009:80d:…	QUIC	101	Protected Payload (KP0), DCID=fb4
1538	8.975419435	10.235.113.74	10.235.113.94	DNS	129	Standard query response 0x659a HT
1539	8.985427820	10.235.113.74	10.235.113.94	DNS	107	Standard query response 0x192e AA
1540	8.985971270	10.235.113.74	10.235.113.94	DNS	95	Standard query response 0x3c17 A
1541	8.987302969	2409:4081:1016:8537…	2404:6800:4003:c1a:…	QUIC	1292	Initial, DCID=66f287636ff3fb15, P
1542	8.987346202	2409:4081:1016:8537…	2404:6800:4003:c1a:…	QUIC	1292	Initial, DCID=66f287636ff3fb15, P
1543	8.987393766	2409:4081:1016:8537…	2404:6800:4003:c1a:…	QUIC	1292	Initial, DCID=66f287636ff3fb15, P
1544	8.990430616	2409:4081:1016:8537…	2404:6800:4003:c1a:…	QUIC	143	0-RTT, DCID=66f287636ff3fb15
1545	8.990724377	2409:4081:1016:8537…	2404:6800:4003:c1a:…	QUIC	1288	0-RTT, DCID=66f287636ff3fb15
1546	8.990747495	2409:4081:1016:8537…	2404:6800:4003:c1a:…	QUIC	1292	0-RTT, DCID=66f287636ff3fb15
1547	8.990765724	2409:4081:1016:8537…	2404:6800:4003:c1a:…	QUIC	1292	0-RTT, DCID=66f287636ff3fb15
1548	8.990813217	2409:4081:1016:8537…	2404:6800:4003:c1a:…	QUIC	964	0-RTT, DCID=66f287636ff3fb15
1549	8.990833821	2409:4081:1016:8537…	2404:6800:4003:c1a:…	QUIC	153	0-RTT, DCID=66f287636ff3fb15
1550	9.013155696	54.71.154.29	10.235.113.94	TCP	74	443 → 54540 [SYN, ACK] Seq=0 Ack=
1551	9.013203748	10.235.113.94	54.71.154.29	TCP	54	54540 → 443 [RST] Seq=1 Win=0 Len
1552	9.014057022	2404:6800:4009:80d:…	2409:4081:1016:8537…	QUIC	95	Protected Payload (KP0)
1553	9.019134271	64:ff9b::2ce2:9e37	2409:4081:1016:8537…	TCP	86	443 → 52452 [ACK] Seq=1 Ack=1359
1554	9.019135179	64:ff9b::2ce2:9e37	2409:4081:1016:8537…	TCP	86	443 → 52452 [ACK] Seq=1 Ack=1790
1555	9.022101418	64:ff9b::2ce2:9e37	2409:4081:1016:8537…	TLSv1.3	2762	Server Hello, Change Cipher Spec

6.Research common services running on those ports



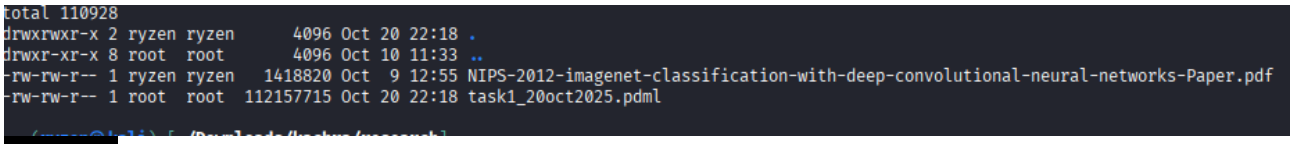
7.Identify potential security risks from open ports.



8.Save scan results as a text or HTML file

=>

https://drive.google.com/file/d/1hGlofTKXt8_-1ebV3WmW5kmQQzuofvf3/view?usp=sharing



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INTERVIEW QUESTIONS

What is an open port?

An open port is a network port on a host that is accepting incoming connections or datagrams. Ports are logical endpoints identified by a number (0–65535) that let services (like a web server, SSH, or a game server) communicate over TCP or UDP. If a port is open, a service is listening on that port and can respond to network requests.

1. **How does Nmap perform a TCP SYN scan?**
   In a TCP SYN scan (often called a “half-open” scan), Nmap sends a TCP packet with only the SYN flag set to the target port. The target’s response reveals the port state:
   - **SYN/ACK** → the port is **open** (Nmap then sends an RST to avoid completing the handshake).
   - **RST** → the port is **closed**.
   - **No response or ICMP unreachable** → the port is **filtered** (likely blocked by a firewall).

This method is fast and stealthier than completing the full TCP handshake because it avoids establishing a full connection.

2. **What risks are associated with open ports?**
    - **Attack surface:** Each open port exposes a service that might have vulnerabilities (bugs, weak auth, misconfiguration).
    - **Unauthorized access:** If services aren't properly secured, attackers can exploit them to gain access.
    - **Information leakage:** Open ports can reveal software versions or service banners that help attackers craft targeted attacks.
    - **Pivoting:** Compromised services can let attackers move laterally inside a network.
    - **Denial-of-service:** Public-facing services can be overwhelmed via the open port.
3. **Explain the difference between TCP and UDP scanning.**
    - **TCP scanning** (e.g., SYN, connect) targets connection-oriented TCP ports. Responses are explicit: SYN/ACK, RST, etc., making results usually reliable. TCP scans often determine whether a service accepts and tries to establish connections.
    - **UDP scanning** targets connectionless UDP ports. UDP has no handshake; many services don't reply when closed. Nmap typically sends an empty UDP packet and interprets responses (ICMP port unreachable = closed; no response = open|filtered). UDP scanning is slower and less definitive because of rate-limiting and silent drops.
4. **How can open ports be secured?**
    - **Close unnecessary ports:** Disable or uninstall unused services.
    - **Use firewalls:** Restrict which IPs/subnets can reach ports.
    - **Strong authentication & least privilege:** Use strong credentials, keys, and minimal permissions.
    - **Keep services patched:** Regularly update software to fix vulnerabilities.
    - **Service hardening:** Disable verbose banners, enforce encryption (TLS), and apply rate-limiting.
    - **Network segmentation:** Keep critical systems separated from public-facing networks.
    - **Monitoring & logging:** Detect suspicious access patterns and respond quickly.
5. **What is a firewall's role regarding ports?**
   A firewall controls traffic to and from a host or network by allowing, denying, or restricting connections to specific ports and protocols. It enforces access rules (e.g., allow SSH only from admin IPs), provides a first line of defense by filtering unwanted traffic, and can log attempts for auditing and detection.

6. **What is a port scan and why do attackers perform it?**
   A port scan is the process of probing a host or network to discover which ports are open and which services run on them. Attackers use port scans to:
   - **Identify attackable services** and their versions.
   - **Map an environment** for lateral movement.
   - **Prioritize targets** for exploitation.
     Security teams also use port scanning defensively to find exposed services and close or secure them.
7. **How does Wireshark complement port scanning?**
   Wireshark captures and analyzes live network traffic at a packet level. It complements port scanning by:
   - **Verifying traffic:** Showing the actual packets exchanged during a scan or an exploit attempt.
   - **Troubleshooting responses:** Helping interpret ambiguous scan results (e.g., why a probe was dropped).
   - **Detecting anomalies:** Revealing unexpected services, malformed packets, or suspicious flows that a port scan alone might miss.
   - **Forensics:** Providing detailed logs of attacker activity or misconfigurations for post-incident analysis.